

Review of Year 2000 Project
Report No. 00-10, May 11, 2000

This report presents the results of the Office of Inspector General's (OIG) monitoring review of the Railroad Retirement Board's (RRB) Year 2000 project. This is the third and final report of the OIG's monitoring of the RRB's progress in implementing its Year 2000 project plan. The prior reviews determined that project management was administered and controlled adequately (Audit Reports No. 99-18 and 98-22, dated September 30, 1999 and September 24, 1998, respectively).

Previously, the OIG assessed the RRB's Year 2000 project plan (Audit Report No. 98-06, dated January 30, 1998). The review recommended project management improvements, which were implemented by the RRB.

BACKGROUND

The RRB pays retirement, survivor, unemployment and sickness benefits to railroad workers and their families and, therefore, has been designated the lead agency for the high impact federal program of retired rail worker benefits by the Office of Management and Budget (OMB). As the lead agency, the RRB is to take a leadership role by ensuring that the integral partners to program delivery have adequate Year 2000 plans, and that the program will operate effectively in the next millennium.

The RRB's Year 2000 project, administered by the Bureau of Information Services (BIS), involved the conversion of all mainframe and personal computer (PC) application systems to ensure all systems correctly process the proper century. The project also ensured RRB operations would not be disrupted due to Year 2000 problems with:

- vendor-supplied mainframe system software;
- data exchanges with outside parties;
- building service systems with date sensitive (embedded) computer chips, such as fire alarms, elevators, and telecommunications;
- personal computer hardware, software, and peripherals; and
- local area network (LAN) servers and operating systems.

The RRB identified 160 mainframe and 70 PC systems requiring conversion. Additionally, 16 mainframe and 22 PC systems were to be retired or replaced. The RRB's goal was to convert all mission critical¹ mainframe and all PC systems by

¹ Mission critical systems are directly related to paying benefits to the railroad community.

December 31, 1998. The remaining non-mission critical mainframe systems were scheduled for completion by September 30, 1999. Each month, the BIS reported the systems' conversion status to the Automated Data Processing Steering Committee and the Board Members.

The conversion of systems included program coding changes and testing of individual systems in a stand-alone environment (unit testing). The BIS had the responsibility of converting the mainframe systems, while the individual user bureaus/offices have converted the PC systems. Both the BIS and user bureaus/offices shared the responsibility for testing system changes. The RRB also tested critical payment systems in a job-processing stream, using Year 2000 dates (fully integrated future date testing). This testing included dates in which major processing cycles occur, as well as dates before and after the turn of the century and leap year. The RRB performed tests at its headquarters in Chicago, Illinois, and at the RRB's offsite disaster recovery facility in Wood Dale, Illinois. After all testing was complete, the RRB considered systems to have met "final certification" for Year 2000 compliance.

Pursuant to OMB guidance, the RRB identified three integral partners with which it exchanges data: the Social Security Administration, the U.S. Department of the Treasury's Financial Management Service (Treasury), and the Health Care Financing Administration. The RRB conducted additional Year 2000 testing of critical operations with each of these three agencies.

The RRB also developed a Business Continuity and Contingency Plan, which focused on alternative processing methods if service disruptions occurred because of Year 2000 issues. This document is an adjunct to the RRB's disaster recovery plan, which focuses primarily on providing the resources necessary to continue mainframe computer and LAN operations during a disaster.

Additionally, in April 1999, the RRB contracted with an outside firm to conduct independent verification and validation of selected mission critical mainframe systems. This review process combined automated software analysis and judgmental review to determine whether the RRB's program source code was Year 2000 compliant.

Lastly, the RRB conducted a "Day One" strategy during the century rollover. This strategy included a core staff working throughout the nation between December 31, 1999 and January 1, 2000 to ensure full program delivery when the RRB offices opened to the public on January 3, 2000. The Day One strategy also provided executive management, business partners, and the public essential information regarding the RRB's Year 2000 condition.

SCOPE AND METHODOLOGY

The objective of the OIG monitoring review was to ensure the RRB's Year 2000 project management continued to be adequately administered, controlled, and completed timely.

The scope of this monitoring review covered the period January 1, 1998 through March 31, 2000.

To accomplish the objective, we:

- reviewed Year 2000 project reports for mainframe, PC, vendor-supplied mainframe system software, building services systems, and data exchanges with outside parties, including the three integral partners;
- reviewed minutes of Automated Data Processing Steering Committee meetings, OMB reports and guidance on Year 2000 issues, and RRB administrative reports;
- reviewed unit test plans, procedures, and test results for 30 OIG judgmentally selected RRB mainframe systems and the 35 mission critical PC systems;
- attended planning meetings and reviewed the test results for 76 OIG systematically selected retirement/survivor cases included in the onsite integrated future date testing;
- reviewed regression testing of unemployment/sickness cases included in the onsite integrated future date testing;
- attended planning meetings and offsite integrated future date testing, including the review of the test results for 90 OIG systematically selected retirement/survivor cases;
- reviewed and followed up on the contractor's independent verification and validation reports of potential flaws in RRB source code that may have created Year 2000 discrepancies;
- reviewed and followed up on the RRB's Business Continuity and Contingency Plan for the Year 2000;
- attended planning and status meetings associated with the RRB's Day One strategy;
- monitored the effects on RRB operations during the century rollover, Day One period (December 30, 1999 through January 4, 2000), and the leap year rollover (February 28, 2000 through March 1, 2000);
- reviewed staffing allocations, project hours, and costs reported for fiscal years 1997 through 1999, and estimated costs for fiscal year 2000; and
- interviewed RRB personnel.

The review was performed in accordance with generally accepted government auditing standards appropriate for the objective described above. To achieve the objective described above, we extensively relied on the computer-processed data produced in Year

2000 tests. Based on our reviews of test plans, procedures, and results, we have assessed the data to be reliable. The fieldwork was performed at the RRB headquarters office in Chicago, Illinois from January 1998 through March 2000, and the RRB's disaster recovery site in Wood Dale, Illinois in August 1999.

RESULTS OF REVIEW

This review showed that the RRB's Year 2000 project management was administered and controlled adequately. During the century rollover, the RRB experienced only minor problems with some systems, which were quickly corrected. No problems were experienced with leap year processing.

The RRB generally met or exceeded its schedule for completing mainframe and PC system conversions. (See chart depicting completion status throughout this project, Attachment 1.) The majority of the systems (94% of mainframe and 100% of PC) were certified final by September 30, 1999, while the last system received final certification on December 22, 1999. Vendor-supplied mainframe system software and building services were reported as fully compliant and the last mainframe system completed future date testing on December 9, 1999. External data exchanges were also tested for future date processing, and testing with the RRB's integral partners was completed in December 1999. The RRB completed Year 2000 upgrades of LAN servers in November 1999, and the last group of non-compliant PCs was upgraded in December 1999.

The details of our review are discussed below. RRB management concurred with the facts and findings contained in this report.

Century and Leap Year Rollovers

To ensure full program delivery during the century rollover, the RRB planned specific tests in its Day One strategy. RRB employees at headquarters and field offices throughout the nation tested daily payment runs for retirement, survivor, unemployment, and sickness cases, and certified the results with Treasury on January 1, 2000. Building services were also tested during the century rollover to ensure all RRB offices would be ready for service on January 3, 2000.

To facilitate the testing and reporting of test results, the RRB set up a command center and participated in a national Information Coordination Center database program that also received Year 2000 status updates for other government agencies, private utilities, and some international organizations. Additionally, the RRB installed additional telephone lines, as well as bypass telephone sets (in case of telephone switch failure) in its headquarters building.

The RRB reported the following minor problems during the century rollover:

- Interactive Voice Response system stating incorrectly that the date was January 1, 20, (AT&T corrected this problem on January 1, 2000);

- Railroad Unemployment Claims System released payments without allowing for the full three-day pre-payment verification period to lapse, (RRB corrected this problem on January 4, 2000);
- A system that produces award letters processed an incorrect date comparison, (RRB corrected this problem on January 4, 2000); and
- Some minor report printing problems, which did not disrupt regular operations.

The RRB did not report any problems on February 29, 2000 (leap year date).

System Conversions

Throughout this review, the RRB has placed Year 2000 conversions as the highest priority. Only mandatory system changes have taken precedence over the RRB's Year 2000 efforts. As a result, the RRB generally met or exceeded the overall conversion schedule of mainframe systems by completing conversion of all mission critical systems by January 1999, and accelerating its completion of non-mission critical systems. Most PC systems were converted on schedule by December 31, 1998. Final certification for all systems was accomplished on December 22, 1999. The following table shows the breakdown of mission critical and non-mission critical systems.

	Mainframe Systems	PC Systems
Mission Critical Converted	88	35
Non-mission Critical Converted	72	35
Retired or Replaced	16	22
Total	176	92

In August 1999, the RRB reported all 44 vendor-supplied mainframe systems as Year 2000 compliant based on testing or vendor compliance certificates. However, four systems could not be fully tested prior to the turn of the century. For the systems in which future date testing could be performed, the last system was fully tested in December 1999. The RRB did not experience any Year 2000-related problems with mainframe systems.

In July 1999, the RRB reported that all building services, including telecommunications and electronic commerce, were compliant based on vendor compliance certificates. In addition to the vendor compliance certificates, the RRB tested building services during the century rollover as part of its Day One strategy. All building services were reported as fully operational following this test.

In order to ensure all PC hardware, software, and peripherals were Year 2000 compliant, the RRB adopted standard configurations for use throughout the agency. In July 1999, the RRB still had over 500 PCs that were not Year 2000 compliant. During December

1999, the RRB completed testing on the last 110 PCs, and applied the necessary upgrades.

The RRB also contracted with an outside firm to assess all the LAN servers in headquarters. They found that 39 of the RRB's 46 servers had Year 2000 problems. Additionally, all field offices needed a communication equipment upgrade to ensure they had Year 2000 compliant LANs and PCs. The field office and headquarter server upgrades were completed in October and November 1999, respectively.

System Testing

The RRB's Year 2000 testing included:

- regression testing of individual systems, which detects faults introduced during system modifications;
- integration testing of systems that share data files or other interfaces based upon current date test data to ensure those systems continue to work together as intended;
- future date testing of individual systems to ensure each system is capable of processing dates into the Year 2000;
- future date testing in an integrated job-processing stream to ensure those systems continue to work together and process railroad retirement, survivor, unemployment, and sickness benefits accurately; and
- end-to-end testing of critical operations with its three integral partners: the Social Security Administration, Treasury, and the Health Care Financing Administration.

The RRB typically assessed test results through manual review or automated comparisons of Year 2000-converted program run output and regular production output. The reviews and comparisons included record counts processed, date fields, computations of amounts payable, and edits.

The OIG judgmentally selected 30 RRB mainframe systems and the 35 mission critical PC systems for review of Year 2000 conversion test plans, procedures, and test results. The OIG found processing exceptions for some mainframe systems and recommended a software patch for one PC system. The RRB has made all required changes for systems that the OIG reviewed.

The OIG did not include any Medicare systems or activities in its review of Year 2000 conversions due to the prohibition on this office's use of funds for any audit, investigation, or review of the RRB's Medicare program. However, the OIG was informed that the last two Medicare-related systems were certified final on December 2, 1999.

The OIG also systematically selected 76 retirement/survivor cases for review of the onsite testing, and 90 retirement/survivor cases for review of the offsite testing. For each case selected, the OIG reviewed the application systems involved (including the initiating system and the related database system) to determine whether the processing condition

under test produced the appropriate results. For example, the processing of a notice of death of the railroad employee annuitant should trigger a termination of the employee annuity and the subsequent calculation/payment of the widow's annuity.

The OIG reviewed the regression testing of unemployment and sickness cases performed onsite. This testing included automated comparisons of selected future dates with a baseline production run to determine whether processing produced accurate results. In both the retirement/survivor and unemployment/sickness test reviews, the OIG did not find any processing errors attributable to Year 2000 program changes.

The RRB successfully completed end-to-end testing with its three integral partners in December 1999. As an example of this testing, the RRB sent files created during the offsite integrated future date tests to Treasury to ensure that Treasury could produce the beneficiary paper checks and electronic funds transfer payments. The RRB also reviewed samples of the paper check output to confirm they showed proper Year 2000 dates. The OIG reviewed selected test results from the RRB's end-to-end testing.

The OIG also followed up on the results of the independent verification and validation of RRB systems. The RRB provided the program source code for 36 systems (approximately 1.9 million lines of code) and the contractor found 765 potential errors. The RRB analyzed the reported discrepancies and decided to make program changes for 347 (about 45%). The remaining discrepancies did not require changes because they involved obsolete or unused code, or were for code misinterpreted by the contractor. The RRB made the last of the program changes in December 1999.

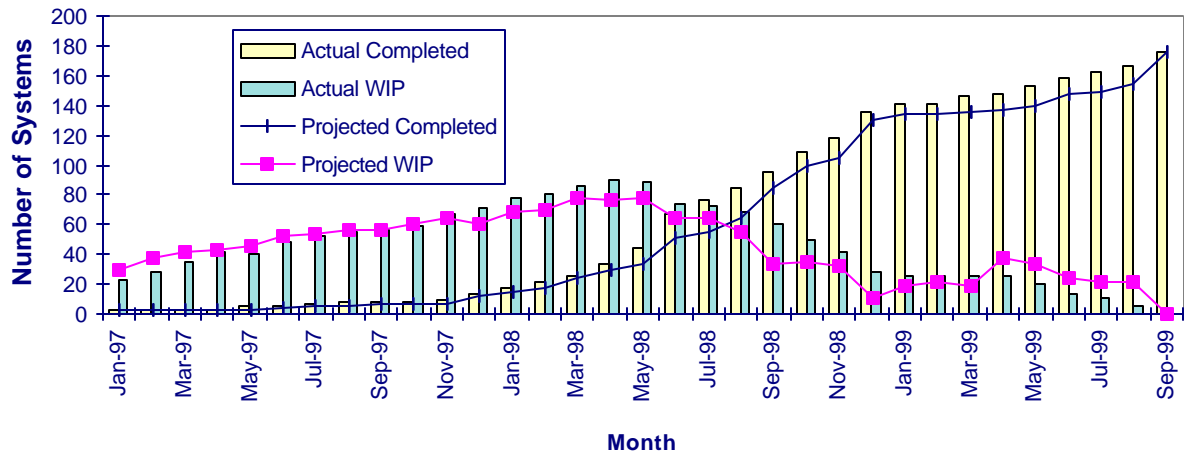
Additionally, the OIG reviewed the RRB's Year 2000 Business Continuity and Contingency Plan and found it did not fully provide for contingency actions in the event that some systems could fail to operate properly. The RRB also conducted tests through review and rehearsal, and made additional changes to the contingency plan. The plan was finalized on October 21, 1999.

Project Hours and Cost

Each year, the RRB has reported the direct cost and FTE workyears for Year 2000 conversion efforts to OMB. During FY 1999, the RRB reported direct cost of \$4,822,217 (45 FTEs). This amount includes \$3,499,334 in personnel compensation and benefits, but excludes supervisory/managerial staff and other indirect support costs such as those attributed to user testing. The total reported direct cost of Year 2000 conversions from FY 1996 through FY 1999 has been \$12,921,096 (126 FTEs).

FY 2000 budgeted expenditures are estimated at \$712,432 (7 FTEs). The budgeted expenditures include equipment needed for the PC/LAN upgrades, Year 2000 software maintenance and lease costs, and personnel costs associated with system testing and program changes. As of March 20, 2000, the RRB has obligated or expended \$691,932 of this amount.

Year 2000 Conversion Progress for Mainframe Systems



Year 2000 Conversion Progress for PC Systems

